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6**PATENT ABSTRACTS OF JAPAN**

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**(54) LAMINATED POLYESTER FILM FOR FORMING LAMINATED METAL PLATE****(57)Abstract:**

**PROBLEM TO BE SOLVED:** To provide a laminated polyester film for forming laminated metal plates which shows an improved impact resistance to hardly cause a crack by an impact at a low temperature while keeping excellent formability, heat resistance, retort resistance and fume and taste retaining properties.

**SOLUTION:** A laminated polyester film for forming laminated metal plates is obtained by alternately laminating a layer (A) composed of a copolymerized polyester (I) having an ethyleneterephthalate showing a melting point of 210 to 245°C as a major repeating unit and a polyester composition layer (B) comprising 10 to 70 wt.% of a copolymerized polyester (II) having an ethyleneterephthalate showing a melting point of 220 to 255°C as a major repeating unit and 30 to 90 wt.% of a copolymerized polyester (III) having an butyleneterephthalate showing a melting point of 170 to 223°C as a major repeating unit on each other so that the film has layers of not less than 5.

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**DETAILED DESCRIPTION**

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**[Detailed Description of the Invention]****[0001]**

**[Field of the Invention]** This invention relates to the laminating polyester film for metal plate lamination fabrication. In case it sticks on a metal plate in more detail and canning processing of spinning etc. is carried out, the outstanding fabrication nature is shown and it is related with the laminating polyester film for metal plate lamination fabrication which can manufacture the metal can excellent in thermal resistance, retort-proof nature, aroma retention \*\*\*\*\*, shock resistance, etc., for example, a drink can, a food can, etc.

**[0002]**

**[Description of the Prior Art]** Although paint is generally performed to the metal can as corrosion prevention of an inside-and-outside side, on process simplification and a health disposition, for the purpose of prevention of pollution, development of the approach of obtaining rust-proofing nature, without using an organic solvent is furthered, and covering by the thermoplastics film is tried as one of them in recent years. That is, after laminating a thermoplastics film in metal plates, such as a tin plate, chromium plated tin-free steel, and aluminum, examination of an approach which carries out canning by spinning etc. is advanced. Laminating copolymerization polyester film was tried as this thermoplastic film, and fabrication nature, thermal resistance, aroma retention \*\*\*\*\*, and the thing that satisfies utilization criteria about shock-proof all were developed (for example, JP,6-039979,A). However, when it is used as a drink can and diversification of a severer operating condition or contents is taken into consideration, much more shock-proof improvement after carrying out fabrication as a drink can is desired.

**[0003]**

**[Problem(s) to be Solved by the Invention]** The technical problem of this invention is offering the laminating polyester film for metal plate lamination fabrication which improves shock resistance and a crack's cannot produce easily especially due to the impact under low temperature, holding the outstanding fabrication nature, thermal resistance, retort-proof nature, and aroma retention \*\*\*\*\*.

**[0004]**

**[Means for Solving the Problem]** this invention persons use polyester film as multilayer laminating polyester film, as a result of inquiring wholeheartedly that the above-mentioned problem should be solved. As one layer of a laminated film The low ethylene terephthalate of a glass transition point (Tg) By using the layer which consists the butylene terephthalate which copolymerized the main copolymerized polyester repeatedly made into a unit, a main adipic acid, etc. of a polyester constituent which mixed the main polyester repeatedly made into a unit at a specific rate A header and this invention were reached [ that the film excellent in the shock resistance under low temperature is obtained, and ].

**[0005]** Namely, the layer which this invention becomes from the main copolymerized polyester (I) repeatedly made into a unit about the ethylene terephthalate whose melting point is 210-245 degrees C (A), The ethylene terephthalate whose melting point is 220-255 degrees C Main copolymerized

polyester (II) repeatedly made into a unit the polyester constituent layer (B) which 10 - 70 % of the weight and the melting point become from 30 - 90 % of the weight (III) of main polyester repeatedly made into a unit about the butylene terephthalate which is 170-223 degrees C It is laminating polyester film for metal plate lamination fabrication which comes to carry out a five or more layer laminating by turns.

[0006]

[Embodiment of the Invention] In order to make orientation crystallinity low, as for the copolymerized polyester (I) which constitutes the A horizon in [copolymerized polyester (I), (II), and polyester (III)] this invention, it is desirable that the melting point is 210 degrees C - 245 degrees C. At less than 210 degrees C, crystallinity becomes [ the melting point ] low too much, and film production is difficult. Moreover, the thermal resistance of an A horizon is inferior and it has a bad influence on the thermal resistance of the whole film. If the melting point exceeds 245 degrees C, the crystallinity of an A horizon will increase, if it extends at temperature higher than the glass transition temperature (Tg) of an A horizon, orientation crystallization will progress and continuation film production nature will worsen. Therefore, copolymerized polyester (I) is making ethylene terephthalate into a main repeating unit, and copolymerizing of copolymerization components other than said component, and needs to adjust the melting point. A copolymerization component may be a dicarboxylic acid component, or may be a glycol component, can mention the alicycle group dicarboxylic acid like \*\*\*\* aliphatic series dicarboxylic acid; cyclohexane dicarboxylic acid, such as \*\*\*\* aromatic series dicarboxylic acid; adipic acids, such as isophthalic acid, a phthalic acid, and naphthalene dicarboxylic acid, an azelaic acid, a sebacic acid, and Deccan dicarboxylic acid, etc. as a dicarboxylic acid component, and can mention alicycle group diols like \*\*\*\* aliphatic series diol; cyclohexane dimethanol, such as butanediol and hexandiol, etc. as a glycol component. As a copolymerization acid component, it is especially desirable to use isophthalic acid or 2, and 6-naphthalene dicarboxylic acid, when attaining this invention. These copolymerization components can use independent or two sorts or more. As an amount of copolymerization of isophthalic acid or 2, and 6-naphthalene dicarboxylic acid, it is 8-15-mol % preferably [ it is desirable and ] to 4-18-mol % and a pan. 0.52-0.80 are desirable still more desirable, and the intrinsic viscosity of copolymerized polyester (I) is 0.54-0.70.

[0007] In this invention, the copolymerized polyester (II) which constitutes a B horizon is main copolymerized polyester repeatedly made into a unit about ethylene terephthalate. An acid component or an alcoholic component is sufficient as this copolymerization component. As this copolymerization component, \*\*\*\* aliphatic series dicarboxylic acid, such as \*\*\*\* aromatic series dicarboxylic acid, such as isophthalic acid, phthalic-acid, 2, and 6-naphthalene dicarboxylic acid, an adipic acid, an azelaic acid, a sebacic acid, 1, and 10-Deccan dicarboxylic acid, etc. can be illustrated, and the alicycle group diol like \*\*\*\* aliphatic series diol [, such as 1,4-butanediol, 1,6-hexanediol and neopentyl glycol, ], 1, and 4-cyclohexane dimethanol etc. can be illustrated as an alcoholic component. These can use independent or two sorts or more. In these, isophthalic acid or 2, and 6-naphthalene dicarboxylic acid is desirable. Although a copolymerization component is based also on the class, it is the rate that 220-255 degrees C of melting points of a polymer become the range of 225-245 degrees C preferably as a result. The thermal resistance after the melting point is mixed at less than 220 degrees C will be inferior. On the other hand, if the melting point exceeds 255 degrees C, the crystallinity of the mixed polymer will be too high and fabrication nature will be spoiled. moreover, the intrinsic viscosity of copolymerized polyester (II) is 0.52-0.80 -- desirable -- further -- desirable -- 0.54 to 0.70 -- it is 0.57-0.65 especially preferably. As for the fabrication nature at the time of can shaping, and properties, such as shock resistance, less than 0.52 are [ intrinsic viscosity ] insufficient. If 0.8 is exceeded, the extrusion-molding nature at the time of film film production will fall.

[0008] Next, in this invention, the polyester (III) which constitutes a B horizon may be main polyester repeatedly made into a unit about butylene terephthalate, and a homopolymer or a copolymer is sufficient as it. An acid component or an alcoholic component is sufficient as the copolymerization component in the case of a copolymer. As this copolymerization component, \*\*\*\* aromatic series dicarboxylic acid, such as \*\*\*\* aliphatic series dicarboxylic acid [, such as an adipic acid, an azelaic

acid, a sebacic acid, 1, and 10-Decan dicarboxylic acid ], isophthalic acid, phthalic-acid, 2, and 6-naphthalene dicarboxylic acid, can be illustrated, and the alicycle group diol like \*\*\*\* aliphatic series diol [ , such as butanediol, 1,6-hexanediol and neopentyl glycol, ], 1, and 4-cyclohexane dimethanol etc. can be illustrated as an alcoholic component. These can use independent or two sorts or more. the inside of these, and an adipic acid -- desirable -- an adipic acid -- an acid component -- receiving -- 5-40-mol % -- copolymerizing is desirable especially from a shock-proof point. Although a copolymerization component is based also on the class, it is desirable to exist at a rate that the polymer melting point becomes the range of 170-223 degrees C and further 180-223 degrees C as a result. The melting point will be inferior in thermal resistance at less than 170 degrees C. In addition, the melting point of a polybutylene terephthalate homopolymer is 223 degrees C. moreover, the intrinsic viscosity of polyester (III) is 0.70-2.00 -- desirable -- further -- desirable -- 0.80-1.70 -- it is 0.85-1.50 especially preferably.

[0009] In this invention, a polyester constituent layer (B) needs to consist of a polyester constituent which carried out melting mixing of above-mentioned copolymerized polyester (II) 10-70 % of the weight and 30 - 90 above-mentioned % of the weight (III) of polyester. At less than 30 % of the weight, polyester (III) cannot improve shock resistance under low temperature, if copolymerized polyester (II) exceeds 70 % of the weight. Moreover, it falls [ the thermal resistance of a film ] that polyester (III) exceeds 90 % of the weight, and copolymerized polyester (II) is less than 10 % of the weight and is not desirable. The more suitable range of polyester (III) is 50 - 90 % of the weight.

[0010] In this invention, as for the transesterification rate of the polyester constituent which constitutes a polyester constituent layer (B), it is desirable that it is 3.0% or more, and it is desirable that it is 3.0 - 9.0%. Although crystallization of a polyester constituent layer (B) is controlled as a transesterification rate is 3.0% or more, and fabrication nature and shock resistance improve remarkably, when it exceeds 9.0%, there is an inclination which the film production nature fall of the film by degradation of a polymer generates. Conversely, it becomes [ fabrication nature or shock resistance ] inadequate and is not desirable in order that crystallinity may go up that a transesterification rate is less than 3.0%. This transesterification rate can be set up by the conditions, for example, the extrusion temperature, and the residence time when carrying out melting mixing of copolymerized polyester (II) and the polyester (III). Moreover, the amount of polymerization catalysts of polyester (III) can also adjust. In addition, a transesterification rate separates the wave of the peak A which measures by 600MHz<sup>1</sup> H-NMR after dissolving a polyester constituent in the mixed solvent of CDCl<sub>3</sub>:CF<sub>3</sub>COOD, and originates in the ester interchange of the detected ethylene terephthalate unit / butylene terephthalate unit, Peak B, and Peak C, calculates each integral value, and asks for a transesterification rate by the following formulas. Transesterification rate =  $\frac{SB}{SA+SB+SC} \times 100$  above-mentioned type, the integral value of Peak A and SB express the integral value of Peak B, and, as for SC, SA expresses the integral value of Peak C.

[0011] In this invention, copolymerized polyester (I), (II), and polyester (III) are not limited by the manufacture approach. For example, the approach of making carry out the ester exchange reaction of the approach of making carry out the polycondensation reaction of the resultant which the main copolymerized polyester repeatedly made into a unit makes carry out the esterification reaction of a terephthalic acid, ethylene glycol, and the copolymerization component, and is subsequently acquired in ethylene terephthalate, and making it into copolymerized polyester or dimethyl terephthalate, ethylene glycol, and the copolymerization component, making carry out the polycondensation reaction of the resultant subsequently acquired, and making it into copolymerized polyester is used preferably. In manufacture of each copolymerized polyester and a polyester polymer, other additives, for example, a fluorescent brightener, an antioxidant, a thermostabilizer, an antistatic agent, etc. can be added if needed.

[0012] moreover, the copolymerized polyester or gay polyester 100 weight section which constitutes still more preferably 0.05-2 micrometers of layers of one of the two of the outermost layer, or both for a 0.1-1.5-micrometer inactive particle preferably the mean particle diameter of 0.01-3 micrometers in the laminating polyester film for metal plate lamination fabrication of this invention in order to improve the handling nature (rolling-up nature) in a film production process -- receiving -- 0.01 - 30 weight section --

0.1-202 weight section content can be carried out preferably. As an inactive particle, an organic inactive particle like a silica, alumina, calcium-carbonate, calcium phosphate, kaolin, inorganic inactive particle [ like talc ], silicone, bridge formation polystyrene, and styrene-divinylbenzene copolymer can be mentioned, for example. An inactive particle is desirable from the point of it being slippery it being the real ball-like particle whose ratio of the major axis and minor axis is 1.2 or less, and making a sex and a moldability balancing. Moreover, when using it for the outside of a drink can, color pigments, such as titanium oxide, a barium sulfate, and carbon black, may be added.

[0013] The laminating polyester film for metal plate lamination fabrication of [laminated film] this invention carries out the laminating of the five or more layers of the 11 or more layers of above-mentioned A horizons and above-mentioned B horizons alternately [ 31 or more layer / 501 or less layer ] more preferably. With a conventional two-layer film (A/B) or a conventional three-layer film (A/B/A or A/B/C), when an impact is added, the B horizon used as a cushion layer cannot absorb an impact, and may break. The probability it to be divided for that this impact-absorbing layer is less than 11 layers becomes high, and shock resistance cannot improve easily. Although more ones of a number of layers are desirable, since the role of an impact absorption will tend to be lost if the thickness of each class is set to 0.01 micrometers or less, the desirable range of the average bed depth which constitutes a B horizon is 0.05-3 micrometers. Moreover, as for a multilayer laminated film, it is desirable that the both sides are A horizons. On a front face, in case a B horizon heats with a roll etc. for extension, it cannot raise to extension temperature required to extend an A horizon, and cannot extend an A horizon. Moreover, in case heat setting is carried out to a B horizon being a front face, in order that a front face may dissolve, temperature is seldom raised but thermal stability is inadequate. Moreover, in order for the laminating polyester film for metal plate lamination fabrication of this invention to adjust whole thickness to the one side or both sides or to improve \*\*\*\*\* and an adhesive property, the laminating of other layers may be carried out further.

[0014] Although the laminating polyester film for metal plate lamination fabrication of this invention does not need to be extended, it is desirable that it is the film by which is extended in the at least 1 direction and biaxial stretching is carried out further. As for extension temperature, it is desirable to carry out in  $T_g + 50$  degree C from the glass transition temperature ( $T_g$ ) of the resin of an A horizon. As draw magnification, in the case of uniaxial stretching, it is 10 times from twice, and even if the extension direction is a lengthwise direction and it is a longitudinal direction, it is not cared about. In the case of biaxial stretching, they are 25 times from 5 times as an area scale factor. As the extension approach, although the well-known extension approaches, such as biaxial stretching, coincidence biaxial stretching, tubular extension, and inflation extension, are possible serially, biaxial stretching is preferably advantageous in respect of productivity and quality serially. Moreover, as for the extended film, it is desirable that heat treatment is stable for thermal stabilization. As temperature of heat treatment, what is lower than the melting point of -30 degrees C of an A horizon is desirable. However, since fusion of a B horizon will start if not much high, aggravation of thickness spots and continuation film production nature fall.

[0015] The laminating of the laminated film of this invention is carried out so that two-layer may be formed by turns by the coincidence multilayer extrusion process using a feed block in the polyester constituent which consists of copolymerized polyester (I) and copolymerized polyester (II) which forms a B horizon, and polyester (III), and it is developed by the die. At this time, the polymer by which the laminating was carried out with a feed block is maintaining the gestalt by which the laminating was carried out. Cooling solidification is carried out on a casting drum, and the sheet extruded from the die serves as an unstretched film. an unstretched film is heated to predetermined temperature -- having -- length -- and -- or it is extended by the longitudinal direction, and is heat-treated and rolled round at predetermined temperature.

[0016] The whole thickness of 6-75 micrometers is [ the polyester film for metal plate lamination fabrication of this invention ] desirable. 10-75 micrometers is 15-50 micrometers especially preferably still more preferably. That to which it becomes easy to produce a tear etc. and thickness exceeds 75 micrometers on the other hand in less than 6 micrometers at the time of fabrication is superfluous

quality, and is uneconomical.

[0017] Although it is desirable to be stuck so that the (A) layer may be made into an adhesion side in case the polyester film for metal plate lamination fabrication of this invention is stuck with a metal plate, there is no fall of the adhesive strength of the film by the contact surface with a metal plate being the (A) layer and a metal plate. As the metal plate with which the laminated film of this invention is stuck, especially a metal plate for canning, plates, such as a tin plate, chromium plated tin-free steel, and aluminum, are suitable. Lamination of the polyester film to a metal plate can be performed by the approach of for example, the following (a) and (b).

(a) Cool a metal plate after sticking a film more than the melting point of a film, crystallize the surface section (thin layer section) of the film which touches a metal plate un-, and stick it. (b) Carry out the priming coat of the adhesives to the film beforehand, and stick this field and metal plate. Resin adhesives well-known as adhesives, for example, epoxy system adhesives, epoxy - ester system adhesives, alkyd system adhesives, etc. can be used.

[0018]

[Example] Next, it has an example and this invention is explained.

[0019] The copolymerized polyethylene terephthalate (intrinsic viscosity: 0.71) is prepared as resin of an A horizon. the ratio of the [example 1] mean particle diameter of 1.0 micrometers, a major axis, and a minor axis -- the relative standard deviation of 1.1 and particle size -- the real ball-like silica particle of 0.15 -- 0.15wt(s)% -- the added isophthalic acid -- 12-mol % -- 50 % of the weight (intrinsic viscosity: 0.73) of polyethylene terephthalate which copolymerized eight mol % of isophthalic acid, and 50 % of the weight (intrinsic viscosity: 1.15) of polybutylene terephthalates which copolymerized 20 mol % of adipic acids were prepared as resin of a B horizon. Each resin is supplied to an extruder after 3-hour desiccation at 160 degrees C. After it carries out melting, and an A horizon branches to 26 layers and a B horizon branches 25 layers, a multilayer feed blocking device in which an A horizon and a B horizon carry out a laminating by turns is used. It was made to join, and it led to the die, with the laminating condition held, and the mutual non-extended sheet of 51 layers with which the cast was carried out to casting drum lifting, and the laminating of an A horizon and the B horizon was carried out was created. At this time, the knockout quantitative ratio of the resin of an A horizon and a B horizon adjusted so that it might be set to 1:1, and the laminating was carried out so that both surface layers might turn into an A horizon. The non-extended sheet was extended 3.2 times to the lengthwise direction at the temperature of 120 degrees C, it extended 3.3 times in the longitudinal direction at the extension temperature of 130 more degrees C, heat treatment was performed for 3 seconds at 190 degrees C, and the laminated film with a thickness [ total ] of 25 micrometers was obtained. To both sides of chromium plated tinfree steel of 0.25mm of board thickness which heated the obtained laminated film at 230 degrees C, lamination and after carrying out water cooling, it cut off at the discoid of the diameter of 150mm, and deep drawing was carried out in the four-step phase using a diaphragm dice and punch, and the side-face non-joint container (it abbreviates to a can hereafter) of the diameter of 55mm was created.

[0020] Like examples 2-14 and the [examples 1-6 of comparison] example 1, as shown in Table 1, many things were adjusted, and the film of examples 2-14 and the examples 1-6 of a comparison was obtained. The property is shown in Table 2. The characteristic value shown in these tables 1 and 2 is measured by the following measuring method, respectively.

[0021] (1) 20mg of chips of melting point polyester resin was sampled, and the melting point was measured for glass-transition-temperature \*\*\*\* with the programming rate of 20 degrees C / min. using DSC (DSC2920) by TA INSU vine face company.

[0022] (2) The intrinsic viscosity of intrinsic-viscosity polyester was measured at 35 degrees C after dissolving in o-chlorophenol.

[0023] (3) Cut down the thickness measurement film of each class to a triangle, and carry out embedding with an epoxy resin after fixing to an embedding capsule. A cross section parallel to a lengthwise direction is used as the thin film intercept of 50nm thickness with a microtome (ULTRACUT-S). The transmission electron microscope was used, and a photograph was observed and taken in acceleration voltage 100kv, and from the photograph, the thickness of each class was measured

and it asked for average thickness.

[0024] (4) The transesterification rate of the polyester constituent which constitutes a transesterification rate polyester constituent layer (B) was measured as follows. About 10mg of polyester constituents which correspond from a film is shaved, and it is 600MHz after dissolving in the mixed solvent of CDCI<sub>3</sub>:CF<sub>3</sub>COOD. It measures by 1 H-NMR. The wave of the peak A resulting from the ester interchange of the detected ethylene terephthalate unit / butylene terephthalate unit, Peak B, and Peak C is separated, each integral value is calculated, and it asks for a transesterification rate by the following formulas.

Transesterification rate = among SB/[ / ] (SA+SB+SC) ] the x100 above-mentioned type, the integral value of Peak A and SB express the integral value of Peak B, and, as for SC, SA expresses the integral value of Peak C.

[0025] (5) As a result of observing about the processing situation of a deep-drawing workability can, it is processed that there are no abnormalities in O:film, and, as for milkiness, fracture is not accepted in a film.

\*\* : Milkiness is accepted in the can upper part of a film.

x: Film fracture is accepted in some films.

[0026] (6) Rust-proofing sex test of the film plane in a can after shock-proof deep-drawing shaping carries out full injection of the water about a good can, cools at 10 degrees C and dropping every ten per each test on a vinyl chloride tile floor side from height of 60cm (NaCl water is put in in a can 1%, an electrode is inserted, and the current value when making a can into an anode plate and applying the electrical potential difference of 6V is measured.) a following EVR trial -- omitting -- the performed result -- O: -- all -- it was 0.1mA or less about ten pieces.

\*\* : It was over 0.1mA about the 1-5 piece.

x: It is over 0.1mA more than about 6 piece, or the crack of a film was already accepted after fall.

[0027] (7) the result of having performed shock-proof evaluation described in (6) after heat-resistant embrittlement nature deep-drawing shaping carried out heating maintenance of the good can for 200 degree-Cx 5 minutes -- O: -- all -- it was 0.1mA or less about ten pieces.

\*\* : It was over 0.1mA about the 1-5 piece.

x: It is over 0.1mA more than about 6 piece, or the crack of a film was already accepted after heating for 200 degree-Cx 5 minutes.

[0028] (8) About the can with good retort-proof nature deep-drawing shaping, full injection of the water was carried out, the steam sterilizer performed 120 degrees C and 1-hour retorting, and it saved for 30 days at 50 degrees C after an appropriate time. After dropping the obtained can to a vinyl chloride tile floor side from every ten height per each test of 1m, the EVR trial in a can was performed.

O : it was 0.1mA or less about a total of ten pieces.

\*\* : It was over 0.1mA about the 1-5 piece.

x: It is over 0.2mA more than about 6 piece, or the crack of a film was already accepted after fall.

[0029] (9) About the good can, smell retaining property deep-drawing shaping filled up with and sealed the soda pop. After holding for 30 days at 37 degrees C, it opened and organoleptics investigated change of a scent.

O : there was no change of a scent.

\*\* : Change of a scent was accepted slightly.

x: Change of a scent was accepted.

[0030] (10) Organoleptics investigated change of the taste like \*\*\*\*\* (9).

O : there was no change of the taste.

\*\* : Change of the taste was accepted slightly.

x: Change of the taste was accepted.

[0031]

[Table 1]

	ポリエステル組成物層 (B)										層数	総層数	総厚み μm	B層の 平均厚み μm	共重合 ポリエステル層 (B) エステル交換率				
	共重合PET (I)					共重合PET (II)													
	共重合成分		融点 (°C)	層数	組成	共重合成分		融点 (°C)	層数	組成									
	モル%	組成				モル%	組成												
実施例 1	4/77/21酸	12	229	26	4/77/21酸	8	239	0.73	50	77/21/2酸	20	195	1.15	50	25	51	25	0.5	6.0
実施例 2	4/77/21酸	12	229	26	4/77/21酸	8	239	0.73	50	77/21/2酸	20	195	1.15	50	25	51	50	1.0	6.0
実施例 3	4/77/21酸	12	229	101	4/77/21酸	8	239	0.73	50	77/21/2酸	20	195	1.15	50	100	201	25	0.12	6.0
実施例 4	4/77/21酸	12	229	15	4/77/21酸	8	239	0.73	50	77/21/2酸	20	195	1.15	50	14	29	20	0.7	6.0
実施例 5	4/77/21酸	6	244	26	4/77/21酸	8	239	0.73	50	77/21/2酸	20	188	1.15	50	25	51	25	0.5	6.0
実施例 6	4/77/21酸	16	219	26	4/77/21酸	8	239	0.73	50	77/21/2酸	20	195	1.15	50	25	51	25	0.5	6.0
実施例 7	NDC	12	228	26	4/77/21酸	8	239	0.73	50	77/21/2酸	20	195	1.15	50	25	51	25	0.5	6.0
実施例 8	4/77/21酸	12	229	26	NDC	8	238	0.73	50	77/21/2酸	20	195	1.15	50	25	51	26	0.5	6.0
実施例 9	4/77/21酸	12	229	26	4/77/21酸	8	239	0.73	50	77/21/2酸	20	195	1.15	50	25	51	25	0.5	6.0
実施例 10	4/77/21酸	12	229	26	4/77/21酸	8	239	0.73	50	77/21/2酸	20	195	1.15	50	25	51	25	0.5	6.0
実施例 11	4/77/21酸	12	229	26	4/77/21酸	8	239	0.73	50	77/21/2酸	20	195	1.15	50	25	51	25	0.5	7.0
実施例 12	4/77/21酸	12	229	26	4/77/21酸	13	227	0.73	50	77/21/2酸	30	181	1.10	50	25	51	25	0.5	5.5
実施例 13	4/77/21酸	12	229	26	4/77/21酸	5	247	0.73	50	—	—	223	1.05	50	25	51	25	0.5	4.0
実施例 14	4/77/21酸	12	229	26	4/77/21酸	8	239	0.73	20	77/21/2酸	20	195	1.15	80	25	51	25	0.5	3.5
比較例 1	4/77/21酸	12	229	2	4/77/21酸	8	239	0.73	50	77/21/2酸	20	195	1.15	50	1	3	25	8.0	6.0
比較例 2	4/77/21酸	5	247	26	4/77/21酸	8	239	0.73	50	77/21/2酸	20	195	1.15	50	25	51	25	0.5	6.0
比較例 3	4/77/21酸	22	204	26	4/77/21酸	8	239	0.73	50	77/21/2酸	20	195	1.15	50	25	51	25	0.5	6.0
比較例 4	4/77/21酸	12	229	26	4/77/21酸	20	209	0.73	50	77/21/2酸	20	195	1.15	50	25	51	25	0.5	6.0
比較例 5	4/77/21酸	12	229	26	4/77/21酸	8	239	0.73	90	77/21/2酸	20	195	1.15	10	25	51	25	0.5	2.5
比較例 6	4/77/21酸	12	229	26	—	—	—	—	—	77/21/2酸	20	195	1.15	100	25	51	25	0.5	0.0

PET: ポリエチレンテレフタレート

PBT: ポリブチレンテレフタレート

NDC: 2,6-ナフタレンジカルボン酸

\*: 配合する前のポリマーの固有粘度を示す



[0032]

[Table 2]

	深絞り加工性	耐衝撃性	耐熱脆化性	耐レトルト性	保香性	保味性
実施例 1	○	○	○	○	○	○
実施例 2	○	○	○	○	○	○
実施例 3	○	○	○	○	○	○
実施例 4	○	○	○	○	○	○
実施例 5	○	○	○	○	○	○
実施例 6	○	○	○	○	○	○
実施例 7	○	○	○	○	○	○
実施例 8	○	○	○	○	○	○
実施例 9	○	○	○	○	○	○
実施例 10	○	○	○	○	○	○
実施例 11	○	○	○	○	○	○
実施例 12	○	○	○	○	○	○
実施例 13	○	○	○	○	○	○
実施例 14	○	○	○	○	○	○
比較例 1	△	×	×	×	△	△
比較例 2	×	△	×	×	×	×
比較例 3	○	○	×	×	△	△
比較例 4	○	○	×	×	△	△
比較例 5	×	×	×	×	×	×
比較例 6	○	○	×	×	△	△

[0033] While excelling in deep drawing nature, heat-resistant embrittlement nature, retort-proof nature, and a \*\*\*\* smell retaining property with the can which used the polyester film of this invention, it is good, without excelling in shock resistance, especially the shock resistance under low temperature, and moreover changing tastes, such as soft drinks, so that clearly from the result of Table 2.

[0034]

[Effect of the Invention] It excels especially in the shock resistance under low temperature, and this invention worsens [ shock resistance and ] tastes, such as soft drinks, moreover and is good while it has the outstanding fabrication nature, thermal resistance, retort-proof nature, and aroma retention \*\*\*\*\*. Therefore, it is suitable to stick on the metal cans for [ containing many objects for soft drinks with cooling and being dealt with / much / under low temperature, or strong corrosive salinity ] contents etc., and especially use for them.

[Translation done.]

\* NOTICES \*

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- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

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CLAIMS

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[Claim(s)]

[Claim 1] The layer which the melting point becomes from the main copolymerized polyester (I) repeatedly made into a unit about the ethylene terephthalate which is 210-245 degrees C (A), The ethylene terephthalate whose melting point is 220-255 degrees C Main copolymerized polyester (II) repeatedly made into a unit the polyester constituent layer (B) which 10 - 70 % of the weight and the melting point become from 30 - 90 % of the weight (III) of main polyester repeatedly made into a unit about the butylene terephthalate which is 170-223 degrees C Laminating polyester film for metal plate lamination fabrication which comes to carry out a five or more layer laminating by turns.

[Claim 2] Laminating polyester film for metal plate lamination fabrication according to claim 1 whose copolymerized polyester (II) is isophthalic acid copolymerized polyester.

[Claim 3] Laminating polyester film for metal plate lamination fabrication according to claim 1 whose copolymerized polyester (II) is 2 and 6-naphthalene dicarboxylic acid copolymerized polyester.

[Claim 4] polyester (III) -- an adipic acid -- 5-40-mol % -- the laminating polyester film for metal plate lamination fabrication according to claim 1 which is copolymerized copolymerization butylene terephthalate.

[Claim 5] Laminating polyester film for metal plate lamination fabrication according to claim 1 whose copolymerized polyester (I) is isophthalic acid copolymerization polyethylene terephthalate.

[Claim 6] Laminating polyester film for metal plate lamination fabrication according to claim 1 whose copolymerized polyester (I) is 2 and 6-naphthalene dicarboxylic acid copolymerized polyester.

[Claim 7] Laminating polyester film for metal plate lamination fabrication according to claim 1 whose laminated film is a biaxially oriented film.

[Claim 8] Laminating polyester film for metal plate lamination fabrication according to claim 1 each whose outermost surface of a laminated film is an A horizon.

[Claim 9] Laminating polyester film for metal plate lamination fabrication according to claim 1 whose number of laminatings is 11 or more layers.

[Claim 10] Laminating polyester film for metal plate lamination fabrication according to claim 1 whose number of laminatings is 31 or more layers.

[Claim 11] Laminating polyester film for metal plate lamination fabrication according to claim 1 whose thickness of the whole film is 6-75 micrometers.

[Claim 12] Laminating polyester film for metal plate lamination fabrication according to claim 1 whose average of the thickness of a B horizon is 0.05-3 micrometers.

[Claim 13] Laminating polyester film for metal plate lamination fabrication according to claim 1 whose transesterification rate of the polyester constituent which constitutes a polyester constituent layer (B) is 3% or more.

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[Translation done.]